Los Alamos to study future computing technology capabilities

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LOS ALAMOS, N.M., Nov. 12, 2015—Los Alamos National Laboratory is exploring the future of computing by critically evaluating quantum annealing technology through the acquisition of a 1000+ quantum bits (qubits) D-Wave 2X™ system. D-Wave is a company that specializes in the development, fabrication, and integration of superconducting quantum annealing computers.

"Eventually Moore's Law (transistors on an integrated circuit double every two years) will come to an end, and Dennard Scaling (performance per watt of computing grows exponentially at roughly the same rate) already has," said John Sarrao, associate director for Theory, Simulation, and Computation at Los Alamos. "Beyond these two observations lies the end of the current 'conventional' computing era, so new technologies and ideas are needed."

Los Alamos will lead a collaboration within the Department of Energy and with select university partners to explore what the current capabilities and limits are to quantum annealing technology. This effort is consistent with the goals of the government-wide National Strategic Computing Initiative.

"The highest return we can expect on any investment this early in the evolution of a game-changing idea such as quantum annealing computing is to facilitate exploration by a cadre of knowledgeable computer scientists and engineers," said Mark Anderson of the Laboratory's Weapons Physics Directorate. "These explorations will lead to a new generation of forward thinkers prepared to apply leading edge technologies directly to solving both hardware and software issues. Those involved in exploring this new technology will be the best positioned to influence its evolution in a direction most beneficial to the nation."

Quantum annealing is an attractive "next generation" technology because of its quantum level effect. At the qubit scale, the effect describes the lowest "energy" state of a system. So if a problem can be described in terms of "energy spent" then that quantum annealing process can efficiently find the problem's optimal state -- like finding the quickest path between two points in the fewest steps.

About D-Wave Systems, Inc.

Founded in 1999, D-Wave Systems is the world's first quantum computing company. The company's mission is to integrate new discoveries in physics, engineering,

manufacturing, and computer science into breakthrough approaches to computation that help solve some of the world’s most complex challenges.

D-Wave's offices are in Vancouver, Canada, Palo Alto, California and Washington, DC. D-Wave is a privately held company.